



# MUSICAL ARCHITECTURE:

## LAYERS OF SOUND & SPACE

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Architectural Design Thesis  
Ball State University  
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*“Sound exists as a phenomenal presence involved in and determining the shape of the world. It partially defines our perceptual, emotional, spiritual and psychological spaces; and contributes to our understanding of ourselves, our environment, and our relationship to each other.”*

-Brandon LaBelle

# ACKNOWLEDGMENTS

A special thanks to....

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I would also like to thank and show a great appreciation for my family and friends who have encouraged me to become the best that I can be throughout the past five years of architecture school. Without your inspiration, knowledge and understanding, this thesis project as well as an academic career could not have been possible.

Thank you!

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# ABSTRACT



This thesis focuses on what I call musical architecture, specifically the parallels between ideas of layering sound in space. My goal was to explore the physiological and the psychological implications of designing space around aural perceptions to create a harmonized sonic environment.

This thesis book is a compilation of two semesters worth of research and development, which resulted in an architectural design that focuses on a person's auditory perception within space. The project is a 170,000 sq.ft. year-round music school and performance venue called Aria Music Center. This facility is tailored to fit Aria Academy, an existing music program located in Muncie that aims to provide an intensive and comprehensive curriculum full of musical experiences.

The project site is within Eagle Creek Park, located in Indianapolis, Indiana. Because the site is located within a quiet area that is totally surrounded by the natural beauty of trees, varying terrain and water, the idea of creating musical architecture with layers of sound in space on this site fits well. The timbre (the natural quality of sound) on this site will therefore be enhanced.

***“THE IDEA IS TO CREATE A WORLD FOR THE AUDIENCE  
TO ENTER WHERE ARCHITECTURE MAGNIFIES THE  
EXPRESSIVE DIMENSIONS OF MUSIC AND SOUND.”***

***-ELIZABETH MARTIN***

# ISSUES & POSITIONS



Music is a complex organization of sounds harmonizing together to produce a single composition. Similarly, architecture is a complex yet harmonious organization of space (Storr 2). Out of the five senses that human beings possess, vision is typically the most developed, while hearing is one of the least. Because of the visual-oriented environment we live in, we naturally pay less attention to *sound* and take it for granted. The ability to hear a diverse range of sounds is without a doubt one of the most enriching dimensions to human life. Sounds are experienced 360 degrees around us 24 hours a day, although not visible, but nevertheless present. Sound can bridge distances in time and space, expressed through countless individual layers of information and design to produce compositions, therefore having a firm hold over our emotional makeup. Sound is invisible, but has the power to change the character of the space we occupy (Schulz-Dornburg).

This thesis focuses on what I call musical architecture, specifically the parallels between ideas of layering sound in space. These layers (both musically and architecturally) are: *density, structure / organization, materials, and emotional interpretations* from both listeners and users. My goal was to explore the physiological (the compositional) and the psychological (the emotional) implications of designing space around aural perceptions to create a harmonized sonic environment.

***“SOUND IS INVISIBLE, BUT HAS THE POWER TO  
CHANGE THE CHARACTER OF THE SPACE WE  
OCCUPY.”***  
-JULIA SCHULZ-DORNBURG

The first layer of sound in space examined was **density**. In music, compositions often contain a variety of different instruments and are combined in different ways. Each contributes something unique to the piece as a whole; for example, percussion sets the beat and rhythm pattern. The dynamics are entirely changed within a symphony when a single instrument is manipulated or removed. How dense a musical piece is depends on the number of instruments there are and how involved they are within the composition. The same goes for sound. Sound has the ability to be configured into numerous layers of unique sounds to produce different outcomes, thus shaping its density. This also relates to architectural space. Architectural density often refers to size, shape and volume of a space. Sounds are perceived differently in each designed space, density being partially responsible. When a single entity is manipulated, space dynamics are altered.

The second layer of sound in space examined was **structure and organization**. All music and sound has some sort of discernible structure, which is the sum of distinct but integrated subsystems such as rhythm, melody, harmony and form. In a symphony when all instruments are ready to be played as one, the organization of instruments first needs to be thought through. If a certain instrumental section is misplaced, there is a great effect on the overall sound deliverance. Some of the most famous musical pieces have simple structures, such as Beethoven's Fifth Symphony. The composition maintains a consistent tempo and emotion that is not forgotten. Similarly, the structure and organization of architectural space is vital to the success of the building so that it will be remembered. Each architectural space contains sounds that are normal to its users, such as HVAC systems and persons traveling through spaces. Together these elements help to create the structure and organization of a space, its identity.

#### SPACE DENSITY



Density is visually represented by space volume, size, form and proportion.

This portion of a project is my study of different ways to express space density visually, through a walkway space on BSU's quad.

***“SOUND HAS PHYSICAL SIZE, DIMENSIONS, DENSITY, VIBRANCY, RHYTHMS AND TEXTURES.”***

-BRANDON LABELLE

#### TIME STRUCTURE IN SPACE



Time structure in space can be represented by space volume, form, proportion, material choice, daylighting, and user interaction.

This project is my study of basic musical structure (4/4 time) through a walkway space on BSU's quad.

The third layer of sound in space examined was **material**. Musical instruments are constructed in many different forms in order to produce a variety of sounds. Instruments made from wood and strings, such as acoustic guitars and violins, produce soft, calming sounds. Instruments made from metal, such as a trumpet, normally produce bold sounds, providing the melody of a song (Musical Instruments). Both musicians and architects use their materials to evoke different emotional responses. For example, architect Daniel Libeskind's Jewish Museum in Berlin is covered in zinc panels on the exterior. Once inside, there are concrete walls and floors with very little light penetrating into the building, suggesting a feeling of remoteness (Jewish Museum Architecture). Not only do building materials evoke different feelings, but they also may be combined and altered in different ways to provide acoustical variations within a space. Concrete produces loud echoing sounds while carpet will absorb sound. It is said that "The instrument produces the sound; the player manipulates the sound" (Martin 45). Power is therefore left to the users of a space to control and manipulate sound experience and perception.

The fourth layer of sound in space examined was **emotional interpretations**. Music is an essential form of communication between people, just as architectural spaces are (Storr 2). In both music and architectural compositions personal interpretations differ for each person; therefore it is difficult for the composer/designer to portray specific sets of emotions. However, they surely have the opportunity to make an attempt. If a composer wants a song to evoke tension, then inconsistent rhythms would be used. Similarly, designers would create small, dark and loud spaces. If a song were to portray joy, it would have a simple and consistent rhythm. In architecture, spaces would be designed to be large, well lit, and have proper acoustical values. Designers and composers must understand the emotional value and impact of sound in order to touch the inner soul of the listener/user. We as composers of space have the ability to shape and mold environments in order to create more appreciative and enjoyable experiences for the users.

#### SOUND & MATERIALS



Each type of material reflects and absorbs sound in different ways, depending on its physical properties. Materials have the ability to be manipulated and reconstructed in countless ways.

This project is a study I did to test sound reverberations using different combinations of materials in a space. Each square has different characteristics of material palette and sound quality.

***"SPACE WITH ITS ASSEMBLY OF SOUND PRODUCERS, LISTENERS, AND SOUND PRODUCING OBJECTS BECOME THE INSTRUMENT."***

-BRANDON LABELLE

#### MUSICAL INTERPRETATION



Music can be visually interpreted in many ways through form, function, materials, light, scale, and color. Building spaces have the ability to be manipulated and reconstructed in countless ways in order to evoke a range of human emotion.

This project is a study I did to practice representing musical emotion visually. A song was chosen and represented in a walkway space on BSU's quad, based on my interpretation.



# PROJECT DESCRIPTION

In order to test this exploration of the physiological and psychological implications of designing a sonic environment, I am designing a building facility to house a Music Center, to be located in Indianapolis, Indiana.

Every year several music festivals are held in Indiana, usually only during the summer seasons. Talented people from all across the nation gather to teach, create, and perform their music to hundreds. One such summer festival, located in Muncie, Indiana, is known as Aria International Summer Academy. Presently, Aria is open to college students and young professionals ages 18 to 32 that wish to have a comprehensive learning experience under the guidance of distinguished faculty. The program aims to provide an intensive and comprehensive curriculum consisting of private lessons, workshops, seminars, lectures, and faculty/student concerts (Aria International Summer Academy).

Currently, Aria guests use most of BSU's facilities during the summer, such as the resident and dining halls, and performance facilities. Aria brings in people from all over the nation. Aria's music program deserves to occupy a facility of their own. Therefore, I am **designing a year-round music school and performance venue called Aria Music Center.**

Because Aria will occupy a facility of its own the ability to host year-round activities will be possible, not just during the summer seasons. The building will be designed to meet the program's specific needs. It will also be designed to contain space for other uses, such as a restaurant and a music information center, in order to attract more of the general public. Because the facility will be open year-round, additional distinguished faculty members and students will be presented with an opportunity to join and experience this unique program.

Principles of musical architecture and layers of sound in space will be evaluated and tested in the Aria Music Center facility design. The design will be heavily influenced by each of the four layers of study: *density*, *structure / organization*, *materials*, and *emotional interpretations* from both listeners and users.



01



02



03



04



# PROGRAM SUMMARY

SPACE	QUANTITY	AREA (SF)	TOTAL AREA (SF)
<b>Connecting Nodes</b>	<b>3</b>	<b>1,500</b>	<b>4,500</b>
<b>Lobby</b>	<b>1</b>	<b>20,000</b>	<b>20,000</b>
<b>Auditorium</b>			
Ticket Sales Office	1	400	400
Performance Viewing Space	1	15,000	15,000
Sound/lighting Control Room	1	240	240
Stage / Backstage	1	7,500	7,500
Dressing Rooms	2	750	1,500
Green Room	2	1,000	2,000
Construction Workshop	1	4,500	4,500
<b>Amphitheater</b>	<b>1</b>	<b>10,000</b>	<b>10,000</b>
<b>Restaurant</b>	<b>1</b>	<b>6,500</b>	<b>6,500</b>
<b>Rehearsal Rooms</b>	<b>30</b>	<b>180</b>	<b>5,400</b>
<b>Recital Hall</b>	<b>1</b>	<b>4,000</b>	<b>4,000</b>
<b>Lecture Hall</b>	<b>1</b>	<b>2,000</b>	<b>2,000</b>
<b>Faculty Offices</b>	<b>20</b>	<b>144</b>	<b>2,880</b>
<b>Conference Rooms</b>	<b>2</b>	<b>400</b>	<b>800</b>
<b>Dorms</b>	<b>94</b>	<b>250</b>	<b>23,500</b>
<b>TOTAL NET SF</b>			<b>110,720</b>
<b>NET / GROSS FACTOR</b>			<b>59,618</b>
A net to gross factor of 65/35 is applied to the total net square feet of 110,720 SF to accomodate space required for circulation, public toilets, stairs, elevators, interior and exterior walls, structure, and mechanical/ environmental systems.			
<b>TOTAL GROSS SQUARE FEET</b>			<b>170,338</b>

# PRECEDENT STUDIES

I began my exploration of how sound defines and works within space with a series of precedent studies. Each study is specifically designed to enhance a person's auditory awareness. Some initiate user interaction for auditory response, while others are designed to explore both aural and visual perception.

**DESIGNER: DOUGLAS HOLLIS**  
**TITLE: LISTENING VESSELS**

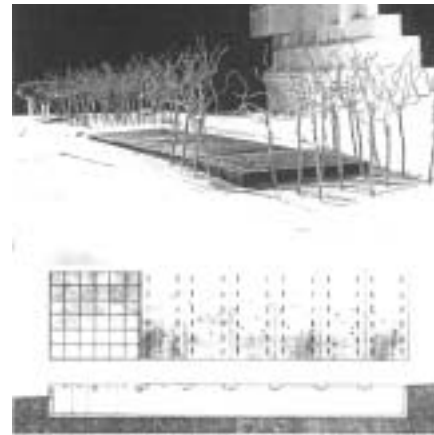


05

This design is a “hearing aid,” a tool to extend our capacity to listen. It consists of two large parabolic forms, placed 115 ft. apart. The installation is a conversation piece that allows a private exchange of voices to travel across a wide, open space. It is an ephemeral sound space that is activated by people's will to communicate.



**DESIGNER: HALI WEISS**  
**TITLE: ECHO CHAMBER**



06

The Echo Chamber is a Holocaust memorial sunk into the ground. It consists of a large echo chamber in a field of thin, rough steel plates that are supported by underground coils, so that those walking on it can feel it give underfoot and hear the sounds from the deep chamber below. Each footstep elicits an uneasy auditory response as in the Holocaust days.

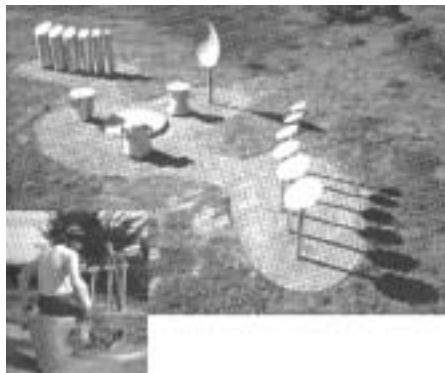
**DESIGNER: DOUGLAS HOLLIS**  
**TITLE: SOUND GARDEN**



07

This Sound Garden consists of eleven sound units with a height of 26 ft. each. Tuned wind-organ pipes embedded in their structures resound as the wind blows across their apertures, their tone varying according to the wind speed. A meandering path orchestrates the visit by ensuring a sequence of changing views and varying grades of exposure to the wind.

**DESIGNER: BILL & MARY BUCHEN**  
**TITLE: ORCHESTRA**



08

This is a participatory sound installation created for communal music making. Components of the installation include: conga shaped drums, gongs, drumsets, a central earthdrum played with the feet and a parabolic dish to focus sounds. Different types of sounds are able to be played from the differently shaped drums and tapping surfaces.

**DESIGNER: STEVEN HOLL**  
**TITLE: STRETTO HOUSE**



10

Visual waveforms were used as an inspiration for this residence design. The house weaves throughout the surrounding layered landscape. The parallel to Holl's design was a musical piece called *Music for Strings, Percussion and Celestra* by Bela Bartok. The piece is broken down into four movements, just as the Stretto house is, and consists of two modes: heavy orthogonal masonry, and light curvilinear metal.

**DESIGNER: BILL & MARY BUCHEN**  
**TITLE: TELEPHONE TUBES**



09

This is a network of tubes that are inter-connected underground. The open pipes are capped with perforated grates. When a person speaks into one end of the tube, the person sitting 20 ft. away is able to hear sounds coming from the opposite end clearly. Sound may therefore stretched to longer distances when confined to small spaces.

**DESIGNER: DANIEL LIBESKIND**  
**TITLE: JEWISH MUSEUM**



11

In this museum's design, there are two basic shapes, a zig-zag and a straight line running through the zig-zag. Whenever the two shapes intersect, there are what Libeskind calls "voids." These voids are completely empty, large in volume with solid concrete. The purpose is to reflect back on the days of the Holocaust.

# SITE LOCATION & ANALYSIS



12



13



14

The site chosen for this thesis project is located on the northwest side of Indianapolis, Indiana. The specific site is located within the boundaries of Eagle Creek Park, on what I call the “island” of the reservoirs edge, encompassing nearly 900,000 square feet. It is called the “island” because water inlets separate the land on both sides of the site, therefore; only one side (the west side) of the site is a long stretch of land. The west side has a private maintenance drive that is used for Eagle Creek Golf Course further to the west. To the east of the site is the Eagle Creek Reservoir, followed by approximately 4,000 acres of wooded terrain and open meadows used by Eagle Creek Park. Because this site is located within a quiet area that is totally surrounded by the **natural beauty of trees, varying terrain and water**, the idea of creating musical architecture with layers of sound in space on this site fits well. **The timbre (the natural quality of sound) on this site will therefore be enhanced.**

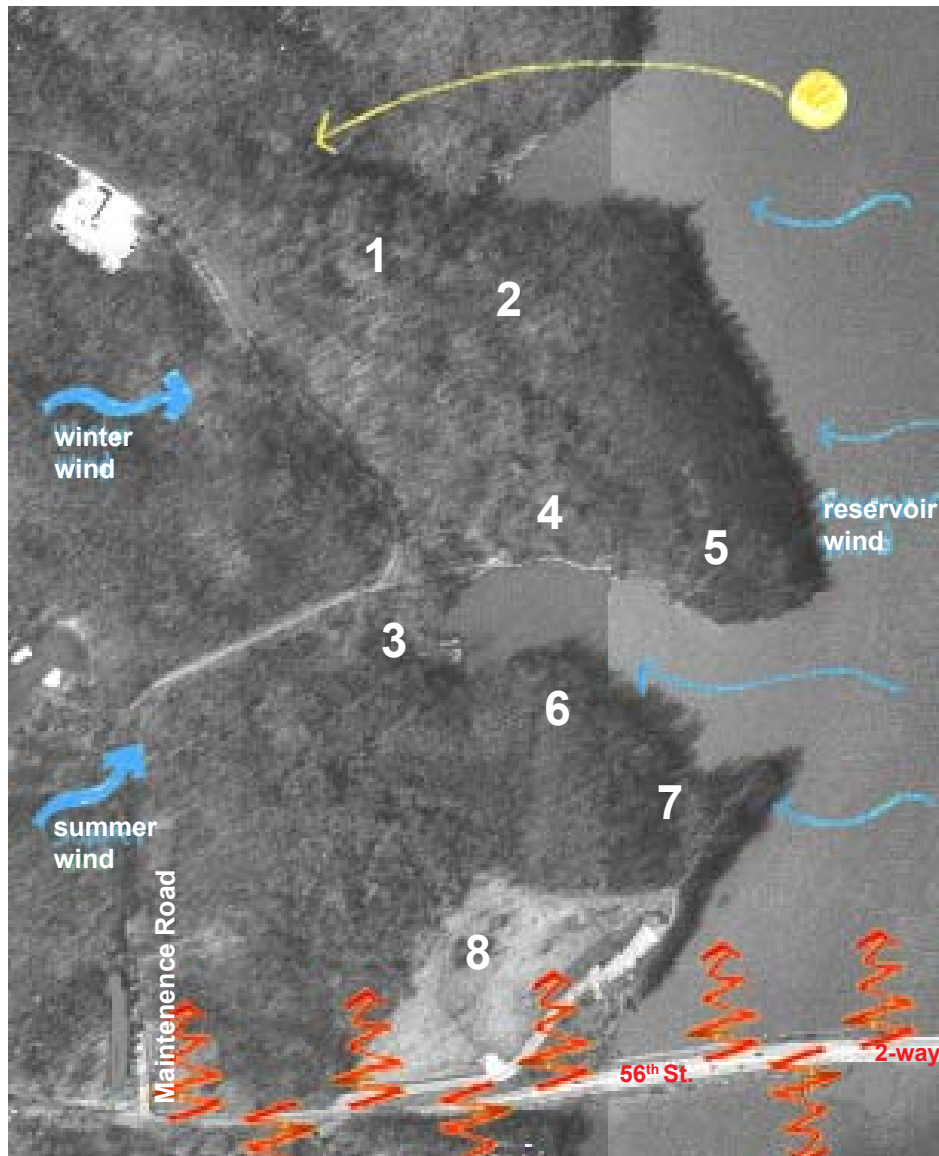
## Site Selection Criteria

- Near a major city
- Near top musical / performance education facilities
- Near other public attractions
- Near airport (for visiting guests)
- Semi-seclusion from surroundings
- Space where sound is recognized & amplified
- Varying terrain
- Near water
- Future growth space

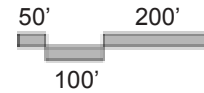
## Site Considerations

- Maintain the serene character of the existing natural Park context.
- Avoid vehicular traffic noise from the 2-way 56<sup>th</sup> street and private maintenance drive to the east.
- Allow easy access to major surrounding public spaces including the golf course to the west, Eagle Creek Park to the east, the airport and neighborhood to the south (across 56<sup>th</sup> street).





## EAGLE CREEK PARK INDIANAPOLIS, INDIANA



Site photos  
1-8 are  
displayed on  
the following  
pages.

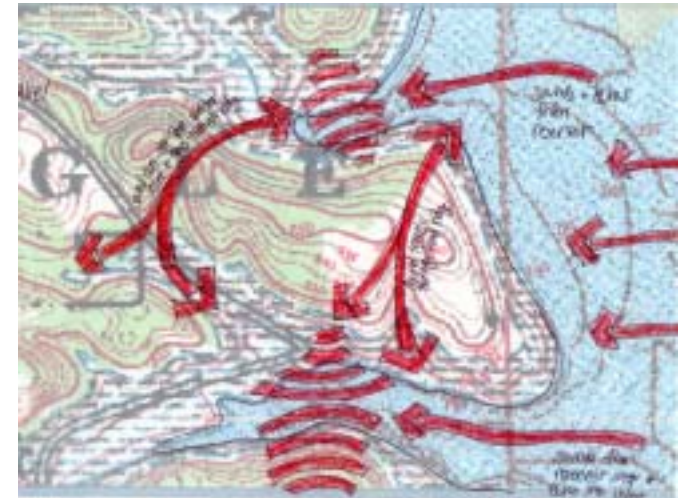
## Site Sounds (year-round)

- Birds
- Flowing water
- Airplanes
- Traffic on 56th St.
- Boats
- Swimmers
- Echos from across the Reservoir
- Trees blowing in the wind
- Crackling twigs & leafs on ground when stepped on

***"MUSICIANS NEED TO BE ENCOMPASSED WITH  
PURITY TO COMPOSE THEIR MUSIC."***

-Mihai Tetel

## SOUND ANALYSIS DIAGRAM



15

1



LAND RIDGES

3



WATER  
INLET

2



TERRAIN

4



WATER INLET

5

**BUILDING SITE- SOUTH**



7

**WATER INLET / 56<sup>TH</sup> ST. BRIDGE**



6

**BUILDING SITE-  
SOUTH**



8

**PARKING AREA**

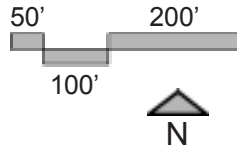




# ARIA MUSIC CENTER DESIGN

## MASTER PLAN

### EAGLE CREEK PARK INDIANAPOLIS, INDIANA



All persons who come to Aria Music Center will need to get on 56<sup>th</sup> street, which is directly connected to I-465. From 56<sup>th</sup> street, visitors turn into a stone road (which currently exists) that leads up to the reservoirs edge. Land directly to the left of the road sharply rises upward, which produced the idea to **construct a parking garage underneath the hill**. Once parked inside the underground garage, they must then go to north side of the structure, where an elevator is, to exit. Visitors pop out of the land into a scenery of rolling terrain, large trees, and a reservoir. They have **escaped and transformed from the busy, noisy world into being completely surrounded by natural beauty**. Next, visitors must travel on a trail that meanders through the dense woods. The sound of nature is calming. A series of **wind harps** are embedded near the trail's path, where air movement produces a series of soft high pitched sounds. Visitors then approach a large water inlet that separates the land and must cross an **acoustical bridge**. This bridge is constructed of steel, which greatly reflects sound. The bridge's floor is a steel grill and when stepped on, sounds will echo because of the water beneath. Once over the acoustical bridge, visitors again meander on the trail until they reach the buildings front entrance, where **another sound sequence is about to begin**.

Aria employees and long-term students may enter the site on the Maintenance Drive (which currently exists for the golf course to the far west) off of 56<sup>th</sup> street. This drive will take them directly to the music venue, where limited parking space will be available.

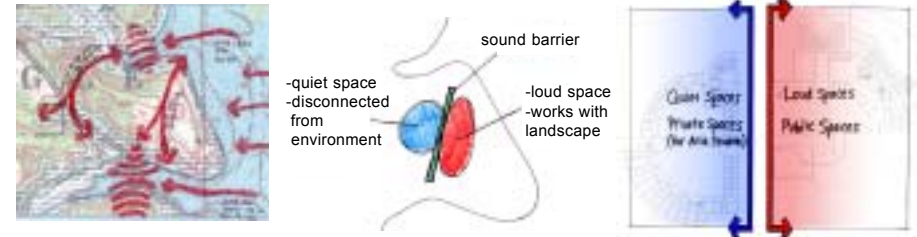


I began by looking at the sound analysis that was done during the site analysis stage of this project. Because of the **great variance in topography**, a diagram was produced to determine where sound waves would most likely travel and weave between land ridges. This led me to **organizing the music center facility into loud spaces (common public spaces for the general public) vs. quiet spaces (private spaces for Aria students).**

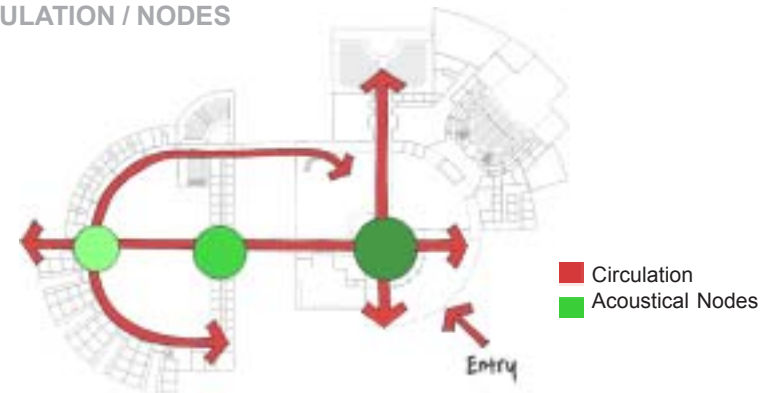
The “loud” end of the building is the performance side where the main auditorium is for the general public, and is partially sunken into the land. As you move towards the west side of the facility, the “quiet” end where the dorms and offices are, the building’s composition slowly emerges from the land and becomes supported by exposed columns. The “loud” end performance side is where musical sounds are being provided to the user/listener; therefore the spaces are more subdued and not as interactive. Conversely, the “quiet” end of the building is where Aria participants spend most of their time; therefore the spaces encourage more user interaction, for example, by a series of sound installations and through material palette choices. These spaces are more experienced by the user. Nevertheless, Aria’s facility spaces integrate and flow together well based on the idea that **music is a complex organization of sounds harmonizing together to produce a single composition.**

The **primary organization of Aria Music Center rests on two axes**, which intersect near to the building’s main entrance. The main walkway, labeled the **“auditory spine,”** is connected to three different **“acoustical nodes,”** each of which are distinctly different both visually and acoustically. These acoustical nodes are indications and markers to nearby spaces, based on sound level ideas. As one travels down the auditory spine, **sound intensity decreases** as well as building volume. The auditory spine is one gigantic **decrescendo** in all respects.

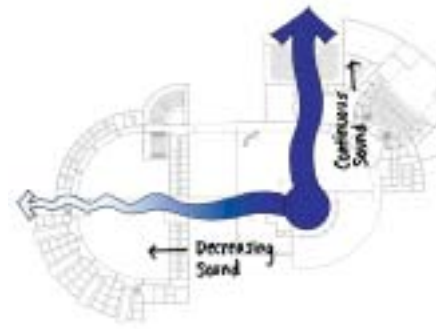
## ZONING



## CIRCULATION / NODES



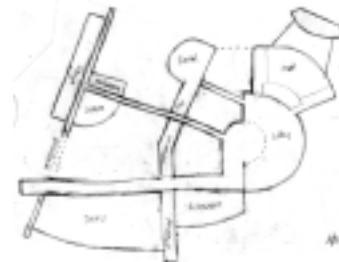
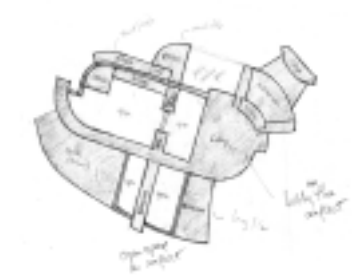
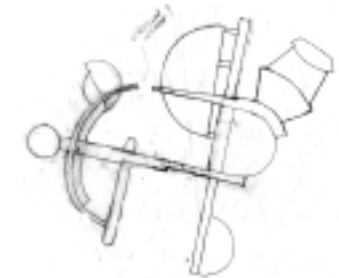
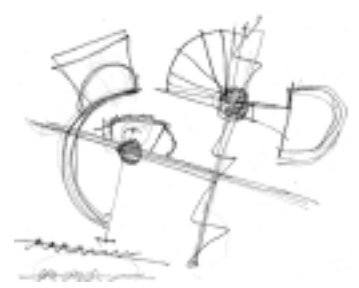
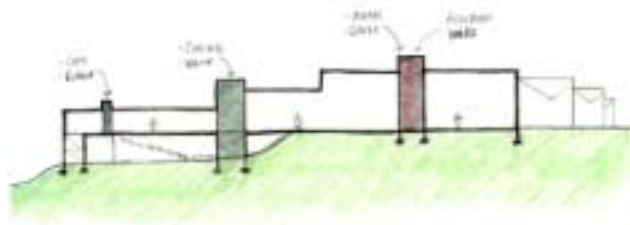
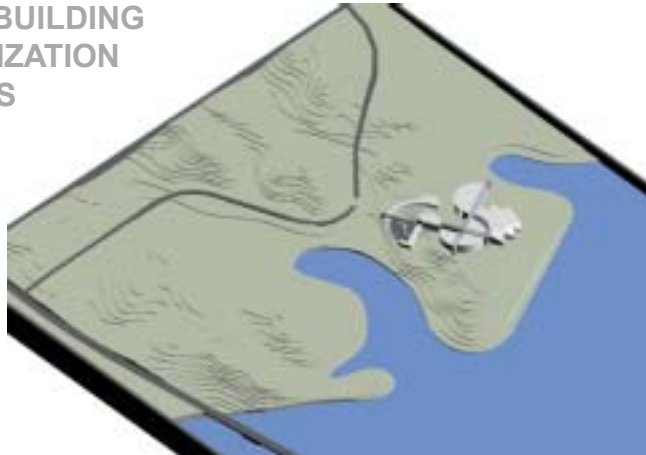
## SOUND GRADIENTS



## LAND/BUILDING RELATIONSHIPS

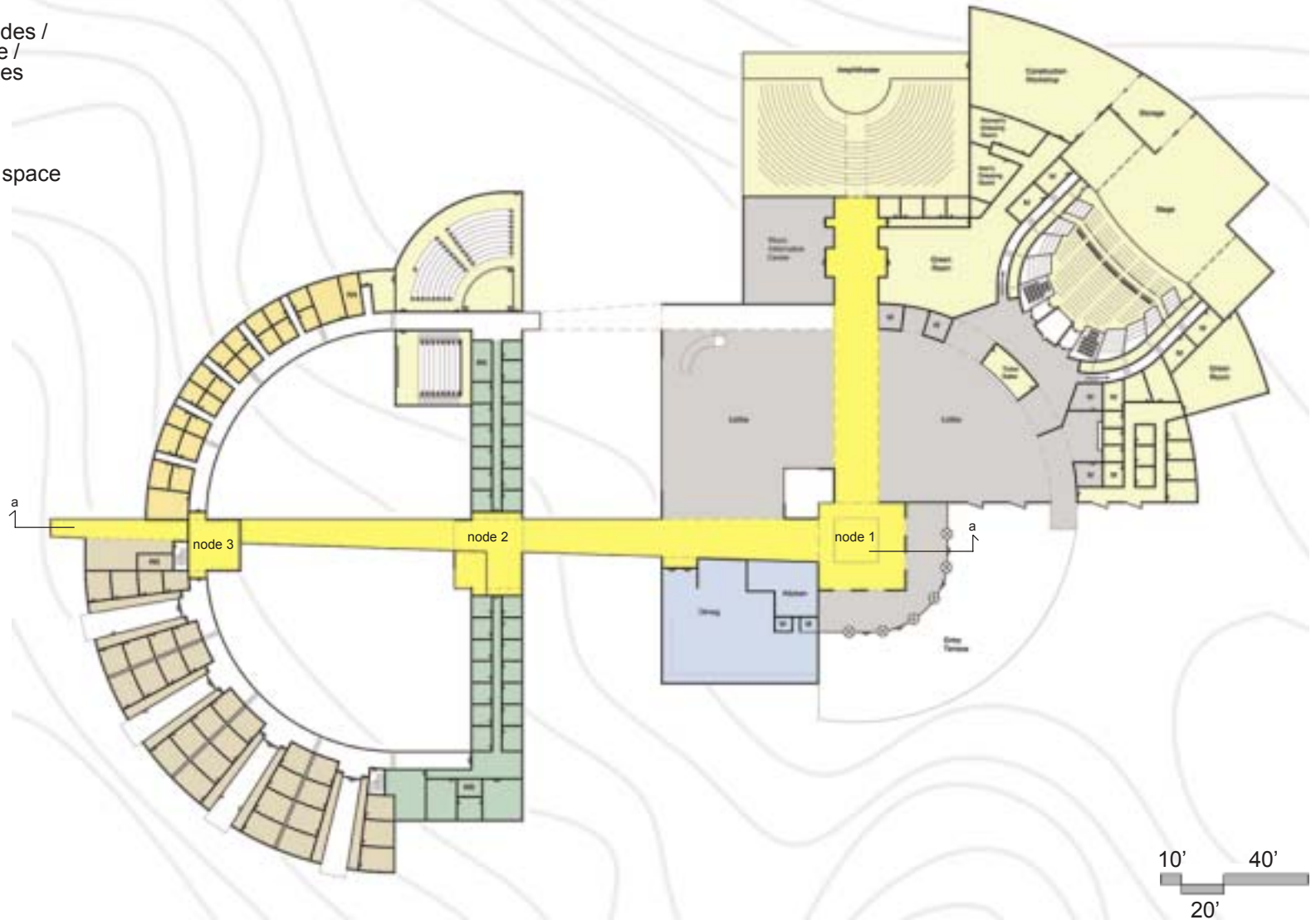


## EARLY BUILDING ORGANIZATION STUDIES



## RESULTING FLOOR PLAN

- acoustical nodes /  
auditory spine /  
circulation axes
- lobby
- performance space
- restaurant
- rehearsal studios
- dorms
- offices

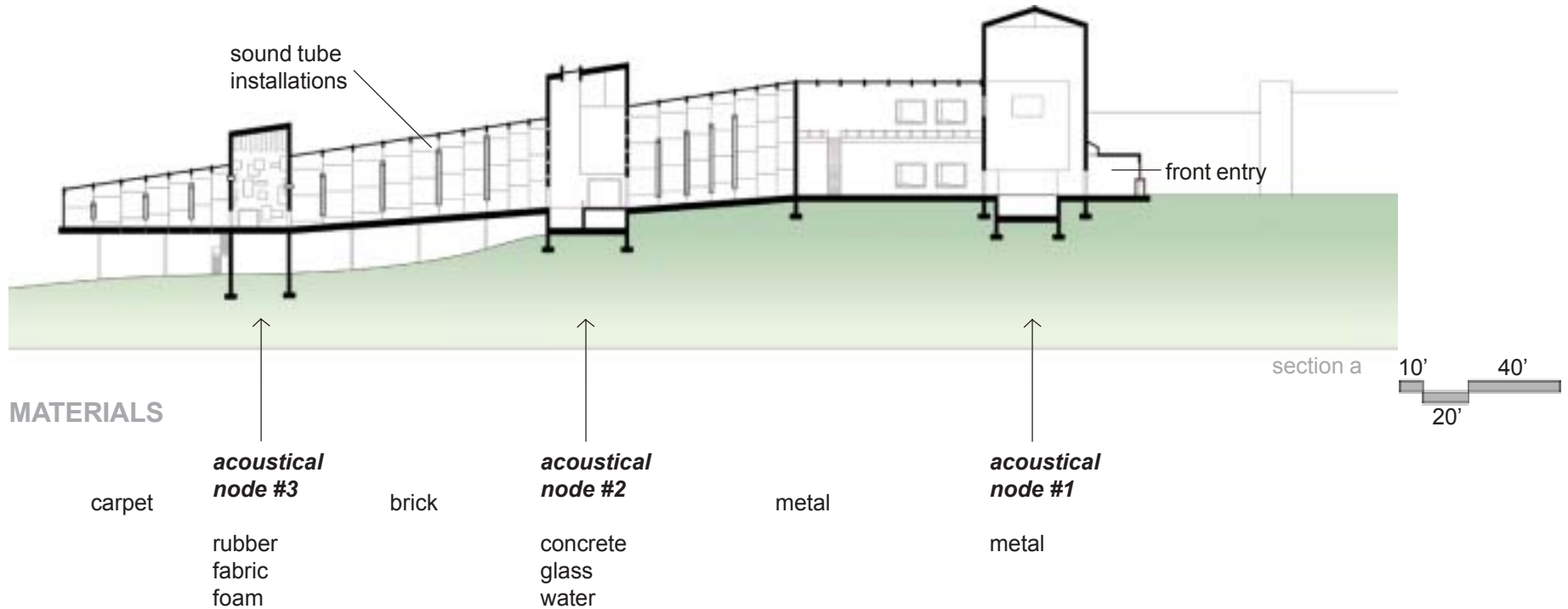






## AUDITORY SPINE SEQUENCE

The main walkway axis, the auditory spine, is connected to three different acoustical nodes, each having a different material palette where sound reverberation is different. These acoustical nodes are also indications to adjoining spaces. As one travels down the auditory spine, sound intensity decreases as well as building density. The auditory spine portrays a unique decrescendo sound.



## MATERIALS

## SOUND REFLECTIVITY



## FRONT ENTRANCE TO ARIA MUSIC CENTER

Upon entering, the focus is centered upon acoustical **node #1, clad in stainless steel panels to reflect the surrounding natural beauty.** The performance side is clad in yellow EIFS panels, allowing it to clearly stand out. The restaurant to the left, clad in brick, blends well into the environment.



## FRONT ENTRANCE / TRANSITION TO NODE #1

Entry into the music center is through rotating doors, which produces a **slow hissing sound, creating anticipation.** Natural daylight spills into the entry space from above, creating an **exciting gateway** into acoustical node #1.





## ACOUSTICAL NODE #1

The first acoustical node is one that everyone will experience because it is right at the facility's main entry. **This node marks the beginning of the auditory spine sequence**, as well as an entry into the performance lobby space. Because the **sound intensity is the greatest in this space, it has the loudest and longest reverberation time**. This is because the space is greatest in volume and because of the material palette. Each of the four walls is clad with a copper paneling system, while two walls are partially clad in stainless steel sheets. The floor is a polished concrete with the center being a steel grill mounted over an empty underground chamber, therefore sound reverberation is enhanced. Out of the three nodes **natural daylight is the greatest here**, entering from two corners of the space and from overhead skylights.



## TRANSITION TO NODE #2

A section of the auditory spine acts as a **transition space between acoustical nodes one and two.**

Because this space is still near the beginning of the decrescendo, loud and long reverberation time is still desirable; therefore the floor is covered in metal tiles. A series of **sound installations line the right side of the spine.** These are hollow stainless steel tubes suspended from wires away from the glass ceiling and wall. Each tube is a different size, therefore when tapped by a traveling individual **different sound tones are produced.** As one travels down the auditory spine, **sound pitch in each tube increases.**



## ACOUSTICAL NODE #2

The second acoustical node falls in the **center of the decrescendo in the auditory spine**. It marks the entry into the music rehearsal room wing. This node is **primarily composed of concrete and glass, based on ideas of sound reflectivity**. Each of the four walls is textured concrete. The top of this space consists of different angles of color concrete volumes, mainly to **diffuse sound reverberation**. The floor is scored color concrete. One corner of this space is all glass providing views to the courtyard and dorm wing. For added sound variance, water streams down the corner glass, emptying into a water pool below the floor. The concrete floor has glass squares cut out so that one can see the water pool below. The **amount of natural daylight is decreased**.

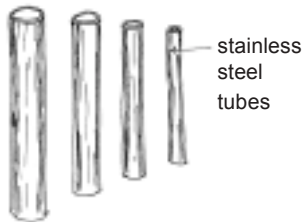




### TRANSITION TO NODE #3

The next section of the auditory spine is a **transition space between acoustical nodes two and three**. Because this space is near the end of the decrescendo, there needs to be shorter sound reverberation, therefore **space volume is decreased** and the floor is composed of brick. Another set of sound tube installations line the right side of the spine, keeping in mind that **pitch continues to increase**.

#### SOUND INSTALLATIONS



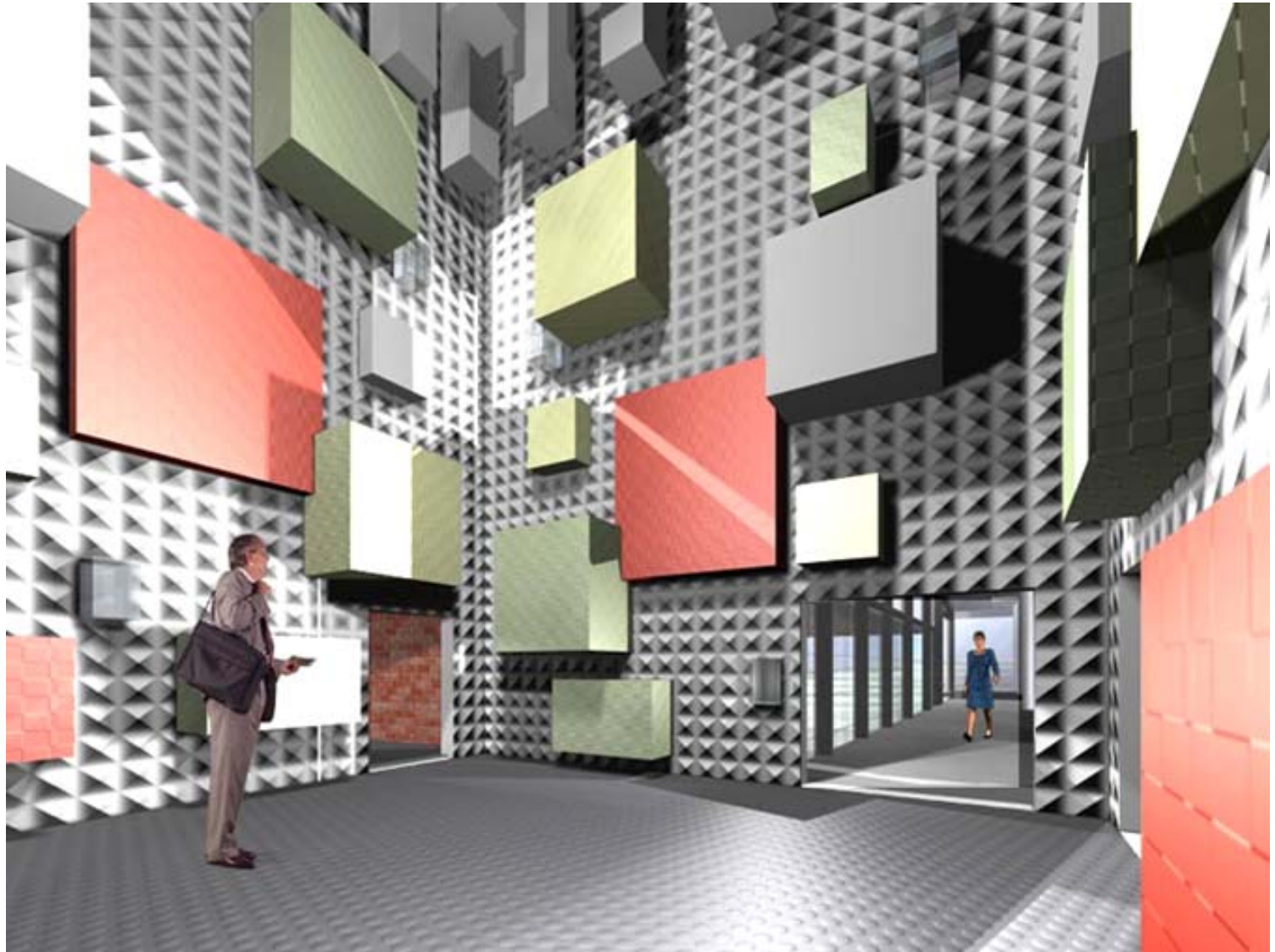
- each pipe a different size,  
open on each end.

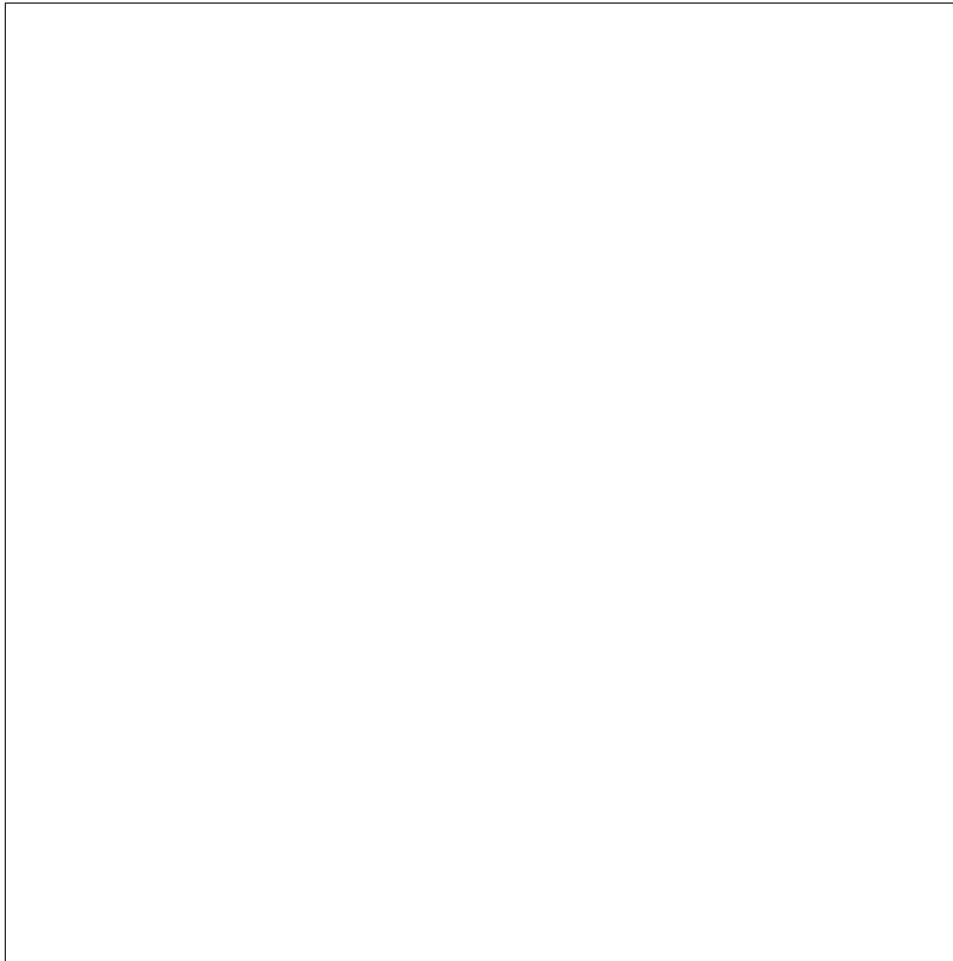
- when tapped, different  
sound tones are produced.



### ACOUSTICAL NODE #3

The third acoustical node is **located at the end of the decrescendo in the auditory spine**. It marks the entry into the offices and dorm spaces. This is the quietest of the three nodes; therefore **sound reverberation is barely noticeable**. Each of the four walls is covered in textured pyramid foam panels, which is a sound absorbing material also used in recording studios. For added interest, a series of different sized cubes extrude out from each wall, which are covered in different colors of fabric. The floor is covered in textured rubber. **Natural daylight is the least here**. Only small cubes punched out in the walls allow minimal light to enter the space.





***“YOU CAN’T MAKE  
SOUND BECOME HARD  
AND SOLID; BUT YOU  
CAN MAKE IT SEEM TO  
STAND STILL, AS IF  
HOVERING IN PLACE, SO  
THAT YOU CAN WALK  
AROUND INSIDE ITS  
A C O U S T I C  
STRUCTURES.”***

***-BRANDON LABELLE***

This CD is a **sound sequence** of a person walking from the time they enter Aria Music Center until they reach the end of the auditory spine. This person’s travel begins from the outdoors, entering through the rotating doors, through acoustical node one, then through each of the transition spaces and the remaining two acoustical nodes. **Notice the smooth decrescendo sound and the increasing pitch of the sound tube installations throughout the entire sequence.**



## LOBBY - VIEW TO AUDITORIUM ENTRANCE

Notice the skylight track above, which is related to the mirror metal tile below. This **leads a person from acoustical node #1** (off to the right) to the outdoor amphitheater (off to the left).

### POSSIBLE SOUND INSTALLATION



- air movement produces a series of soft high pitched sounds.

- pitch depends on air speed, diameter, tension, and length of strings.





## LOBBY- UPSTAIRS NEAR MUSIC INFORMATION CENTER

The **above space in the lobby provides entrances** into the upper level auditorium seating space, views overlooking the outdoor amphitheater, and an entrance into the upper level music information center (left).



## LOBBY- VIEW TO MUSIC INFORMATION CENTER & AMPHITHEATER ENTRANCE

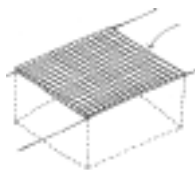
Notice the skylight track above, which is related to the mirror metal tile below. This **leads a person from acoustical node #1** (behind) to the outdoor amphitheater.



## ACOUSTICAL NODE #1 (EXITING VIEW)

Acoustical node #1 marks the **beginning of the auditory spine sequence**, as well as an entry into the performance lobby space. Because the sound intensity is the greatest in this space, it has the **loudest and longest reverberation time**.

### SOUND INSTALLATION



steel grill  
mounted  
over an  
underground  
chamber.

- when stepped on,  
sounds resonate  
longer & louder.

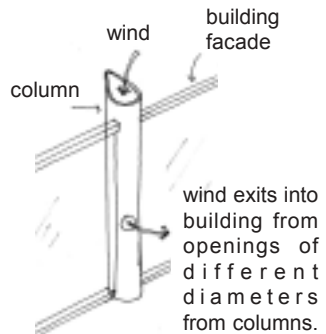




## CIRCULATION FOR DORMS, LEADING TOWARDS NODE #3

This circulation space provides an **entry into the dorms** for Aria students and faculty. Connections are made to acoustical node #3 and the rehearsal studios. Notice the **change in floor materials** as well as the steps leading downward. The circulation space also provides great views **overlooking a courtyard**, used by the students, and the **auditory spine**.

### POSSIBLE SOUND INSTALLATIONS



- wind therefore produces a series of soft tones throughout a space.



## OUTDOOR VIEW OF DORMS

Each set of dorms has an **opening** to separate the rooms for students to gather and rehearse their music within large groups. Because this space is outdoor, tight, and the flooring is a metal grill, **sound is amplified because of longer reverberation time.**



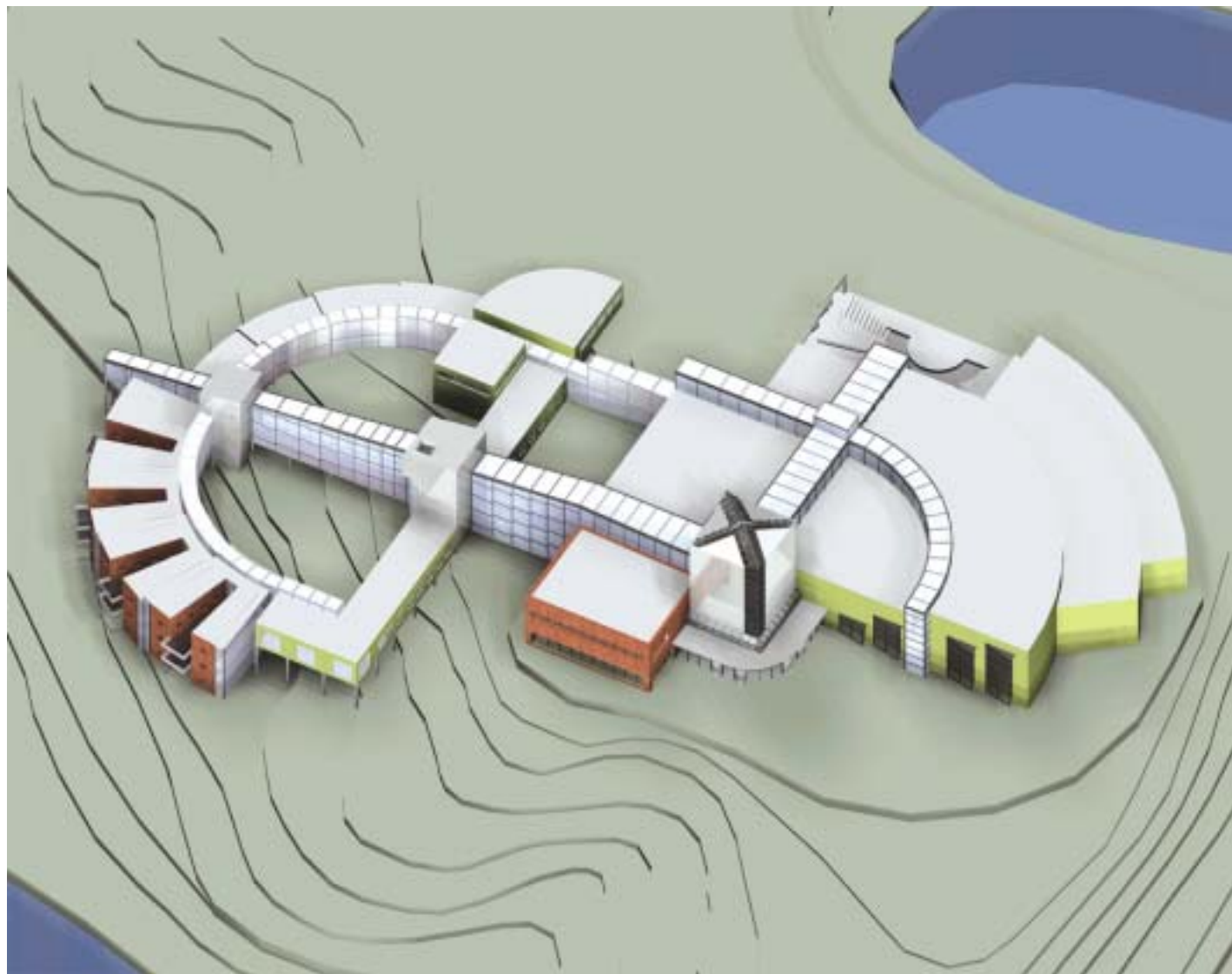
## AMPHITHEATER / GENERAL GATHERING SPACE

This space acts as in **outdoor performance space** as well as a general gathering space for Aria students. Seated guests during performances overlook the **scenic backdrop** of the reservoir and wooded terrain.



***"THE RESULT IS NEITHER  
PURELY MUSICAL NOR  
ARCHITECTURAL, BUT A  
HYBRID THAT FALLS  
BETWEEN THE TWO  
DISCIPLINES."***

***-ELIZABETH MARTIN***





# REFLECTIONS

After taking a step backwards and viewing all that has taken place within the past year of my academic life, I am truly amazed at what all I have learned, experienced, and accomplished. I feel as if I am just beginning this thesis project. I never realized how many countless dimensions of sound there are and how many different paths I could have taken for this project. Although this served as a problem in the beginning of the year, I believe it was narrowed down greatly for the final result. In spite of this, there still is room for a more focused design project. In the future, I would like to further investigate how sound truly effects space, focusing on the users perception as well as the technicalities of sound engineering. Overall, I am greatly satisfied with the result of my thesis design project.

This thesis is a compilation of all of the struggles and achievements from the past five years of architectural education and I am deeply appreciative of all who helped and shared this journey with me.

***“THOSE WHO ARE SUCCESSFUL NEVER LOOK TOWARDS  
THE GROUND FOR THE NEXT STEP, BUT TOWARDS THE  
HORIZON.”***

-ANONYMOUS

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## Illustrations:

Photos 01,02,03,04:	"Aria International Summer Academy."
Photos 05,06,07:	Julia Schulz-Dornburg.
Photos 08,09:	Bill Buchen.
Photo 10:	Elizabeth Martin.
Photo 11:	"Jewish Museum Architecture."
Photos 12,13,14:	<a href="http://www.mapquest.com">www.mapquest.com</a> .
Photo 15:	<a href="http://www.terraser.com">www.terraser.com</a> .

# Aria Music Center

